Overseas entry decision and ownership strategy of Japanese companies : institution and corporate governance

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Abstract

Using 20-year panel data, this paper tests Japanese companies' sequential decisions: (1) to invest abroad or not and (2) if so, what ownership strategy for that local company to be employed. In addition to transaction advantage emphasized by traditional studies on FDI, the main focus of the paper is the role of corporate governance of the parent companies and institutional environment of the host countries. Through Heckman's two-step estimation, corporate governance is found to play an important role for entry decision but not for ownership strategy. Transaction cost approach approximated by R&D and real GDP per capita has been well supported. Most importantly, an institutional environment favorable to MNEs leads to higher level of ownership of local companies. Thus the determinants of entry decision and ownership strategy should be carefully investigated.

Key words: Sample selection bias; Entry decision; Ownership strategy; Corporate governance; Institution

JEL Classification: F2; O53; C3

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1 Introduction

Two main questions on the geographical analysis of foreign direct investment (FDI) are why a firm decides to be multinational and why differing degrees of ownership are utilized by multinational enterprises (MNEs). Several hypotheses have been suggested to address the former question. The most popular approach is the transaction cost theory (Coase, 1937), indicated as "transaction advantage" throughout the paper, which investigates the determinants of FDI and discusses the nature of the firm (Dunning, 1981; Rugman, 1981; Markusen, 1995). It argues that because of high transaction costs associated with the difficulties in selling intangible assets, firms can only gain a return on these assets by producing the goods themselves. In fact, this view has been central to much recent analyses of MNE's role in the economy (Helpman, 1984; Markusen, 1984; Helpman and Krugman, 1985; Ethier, 1986; Barrel and Pain, 1999).

Once a firm has decided to enter a foreign market, it must make an ownership decision on which ownership to use for that market, where ownership is defined as percent equity holding taken when a foreign investment is made. Most early studies on ownership strategies concentrate on transaction cost explanations such as Buckley and Casson (1976), Hennart (1982) and Rugman (1982). Driven by transaction-related motives, a direct investment in a foreign market means transferring of firm-specific advantages to that market (Hymer, 1976). Hence, higher ownership levels are interpreted as a response to the need to protect firm-specific knowledge from unwanted dissemination (Grossman and Hart, 1986). This argument is legally supported by various researchers in their empirical examination of ownership strategies (e.g., Anderson and Gatignon, 1986; Gatignon and Anderson, 1988; Gomes-Cassers, 1989; Erramilli and Rao, 1993; Padmanabhan and Cho, 1996).

While the need to safeguard assets transferred to the foreign investment has been recognized as an important determinant of foreign ownership levels, recent works have begun extending the transaction cost approach by including institutional variables of host country. Institutional variables include a broad array of host country characteristics such as political and legal rules and social norms for business transactions which enhance our understanding of ownership strategies (North, 1990; Roberts and Greenwood, 1997). Aspects of the institutional environment can have direct and indirect effects on a foreign firm's

ownership strategy (Kogut and Singh, 1988; North and Weingast, 1989; Contractor, 1990). Several empirical studies (e.g., Beamish and Banks, 1987; Gomes-Casseres, 1989, 1990; Hennart, 1991; Hennart and Larimo, 1998; Delios and Beamish, 1999; Brouthers and Brouthers, 2000; Makino and Neupert, 2000) explored the influence of local environment on ownership strategies and found that the foreign parent's level of ownership declined with the increased need to source locally based host country assets.

The sharp increase of Japanese FDI over the last decade has provoked a substantial amount of research into the determinants of Japanese FDI. There is now an extensive body of literature suggesting that Japanese investment in industrial countries are explained by similar factors, mainly firm-specific advantages as those that explain foreign investments by U.S. or European firms (Kimura, 1989; Kogut and Chang, 1991; Drake and Caves, 1992; Sleuwaegen and Yamawaki, 1992; Fukao et al., 1994; Hennart and Park, 1994; Belderbos and Sleuwaegen, 1996). They show that Japanese FDI is positively related to industry traits such as R&D and advertising intensities as proxies for firm-specific intangible assets owned by firms in the industry. However, a recent study on ownership strategy of Japanese MNEs by Delios and Beamish (1999) finds that when firm-level asset specificity was examined jointly with institutional variables, the observed patterns in ownership levels in the subsidiaries of the nine East Asian countries were not consistent with the predictions of transaction cost theory.

Using 20 year panel data of Japanese companies, this paper contributes to the literature through the following three ways. First, since the traditional approach discussed above considers separately entry decision and ownership strategy so that domestic companies which do not join the investment abroad are ignored, this paper simultaneously considers these two decisions and empirically investigates the relative importance of the main approaches discussed above. To test jointly the determinants of entry decision and ownership strategy, this paper uses Heckman's (1979) two-step etimation procedure.

Second, this paper contributes to the growing debate surrounding transaction cost theory (Kogut and Zander, 1993; Ghoshal and Moran, 1996; Madhok, 1997) by testing the predictions of this theory in a model with improved measures of transactional advantage and against competing explanations regarding the importance of nontransactional factors

such as corporate governance of parent companies and institutional characteristics of host country that are less considered in previous empirical studies. In estimation analysis, corporate governance is defined as ownership structure by foreign investors, financial institutions and individual investors. As Moschandreas (1994) indicated, the ownership structure of Japanese firms is characterized by a relatively large equity share owned by banks and other financial institutions.

Third, it provides empirical estimation advantage by using firm-level data. Compared to the studies referred above, this paper is expected to increase the robustness of estimation results by extending the number of host countries, sample firms and sample periods.

Through Heckman two-step estimation, corporate governance is found to play an important role only for entry decision but not for ownership strategy. R&D which reflects transaction advantage plays a significant role for entry decision as well as ownership strategy while advertisement intensity does not. Another variable of transaction advantage, real GDP per capita of host country, shows inverse relation with ownership level. The estimation results are in contrast with the findings by Delios and Beamish (1999) for Japanese MNEs in East Asian countries.

Most importantly, the institutional environment plays a significant and robust role in ownership strategies, suggesting that an environment favorable to MNEs leads to higher level of ownership of local companies. Finally, other control variables such as age and keiretsu are not shown to be significant for entry decision as well as ownership strategy, rejecting the arguments of organizational ecology theories.

The paper is organized as follows. Section 2 discusses the model structure and Section 3 describes data and determinants of entry decision and ownership strategy. After the estimation results are discussed, Section 5 concludes.

2 Model Specification

2.1 Model Structure and Ownership Strategy

The model structure on the joint decision of entry decision and ownership strategy is simplified in Figure 1. In stage 1, we suppose that all companies in Japan need to decide whether

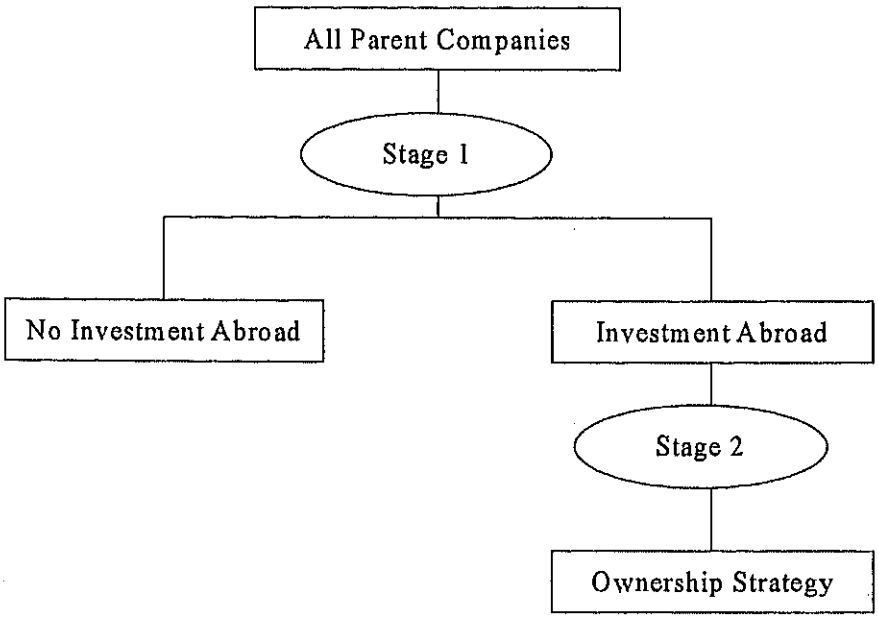

Figure 1: Model Structure

they will invest abroad or not. This entry decision is mainly determined by transaction advantages as well as the other characteristics of the parent companies such as corporate governance and age. Through this, unlike in previous studies, companies that are not investing abroad are also considered in the estimation process.

In stage 2, companies that have decided to invest abroad need to choose the share of ownership of local companies in the host countries. Their decision on ownership level is assumed to be determined by their transactional advantage over local competitors, their own corporate governance structure as well as their preference for an investment environment, i.e., institutional environment.

Since the entry decision in stage 1 has been developed well in the studies referred above, the ownership strategy in stage 2 is discussed in detail. In the beginning, corporate governance is assumed to be constant over the model to focus on the joint effect of transaction advantage and institutional environment.

Let us assume a simple nonlinear combination of institutional environment and transaction advantage. Then ownership level, $0 \leq Own_{ijt} \leq 1$, of firm i in country j at time t is

determined by:

$$Own_{ijt} = \Theta_{jt} G_{ijt}^{\eta} \tag{1}$$

where Θ_{jt} is the institutional environment of host country j at time t and G_{ijt} is defined as transaction advantage between parent company i and company j in the host country at time t.[1] Here $\eta > 0$ implies a nonlinear and positive relation between transaction advantages and ownership levels. Figure 2 (with $\eta = 1$) shows how institutional environment and transaction advantage play roles in ownership strategy and provides the following implications.

Remark 1 ***(Institutional Environment)*** *Suppose that parent company i decides to invest to two countries 1 and 2, and assume that two host countries have the same transaction advantage, G_0, but different levels of institution environment, $\Theta_1 > \Theta_2$. Then we can easily show that parent company i will prefer higher ownership for country 1 under the same transaction advantage, $own_{i1} > own_{i2}$.*

Remark 2 ***(Transaction Advantage)*** *Suppose that the two host countries, 1 and 2, have the same institutional environment, $\Theta_1 = \Theta_2$. The ownership levels chosen by parent company i will be ranked solely by transaction advantage, supporting transaction cost hypothesis.*

Remark 3 ***(Transaction Advantage and Institution)*** *Assume that transaction advantage with country 1 is lower than that with country 2, i.e., $G_{i1} < G_{i2A}$ or $G_{i1} < G_{i2B}$. Since the institutional environment of country 1 is better than that of country 2, $\Theta_1 > \Theta_2$, the ownership will be Own_{i2A} or Own_{i2B}, depending on transaction advantage.*

2.2 Empirical Specification

The determinants of entry decision and ownership strategy can be effectively examined by jointly investigating the factors discussed above such as transaction advantage, institution, and corporate governance.

[1] For a brevity, the same symbol, j, is used for the host country and company.

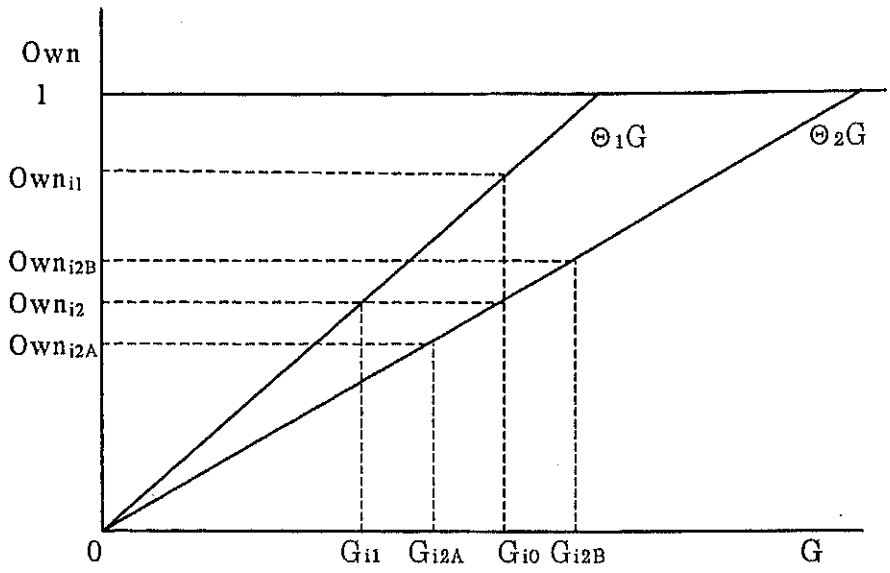

Figure 2: Gap in Transaction Advantage and Institutional Environment

First, in order to identify the determinants of FDI decision, the following stochastic model of the latent variable is used.

$$FDI_{it} = \alpha X_{it} + u_{it}, \tag{2}$$

where FDI_{it} is a latent variable of FDI of firm i at time t which is observed only when positive. The matrix, X, includes various firm characteristics. The last term, u, represents the well-behaved stochastic error term. Notice that FDI_{it} is independent of host country j. Thus equation (2) assumes that the entry decision by individual firm is conducted by its own characteristics because all firms face identical institutional environment in the world.

Then the entry decision function is defined by the following binary variables:

$$d\_FDI_{it} = 1 \text{ if } FDI_{it} > 0 \text{ and } = 0 \text{ otherwise.} \tag{3}$$

Under the assumption of normal distribution for a probability $p(d\_FDI_{it} = 1|X_{it})$, a maximum-likelihood probit model is used to estimate the following equation.

$$d\_FDI_{it} = \alpha X_{it} + u_{it}. \tag{4}$$

Next, a firm's strategic decision on which ownership to use in accordance to its entry to a foreign market is estimated by using the following:

$$Own_{ijt} = \beta_0 G_{ijt} + \beta_1 X_{it} + \beta_2 Y_{jt} + \varepsilon_{ijt} \text{ if } FDI_{it} > 0, \tag{5}$$

where Own_{ijt} is the ownership share of firm i to a subsidiary in country j at time t. X_{it} is the same as in equation (2) and Y_{jt} is included as another set of independent variables in order to consider the effects of host country characteristics which are independent of the parent company. Note that all MNEs investing to the same host countries face identical host country characteristics. ε_{ij} is a well-behaved stochastic error term.

Since Own_{ijt} is defined only between 0 and 1, equation (5) is estimated by a Tobit model, treating the firm specific term, ε_{ij}, as a stochastic variable. The likelihood function to estimate Tobit model involves integration over the firm random effects, ε_{ij}. We utilized an approximation of the likelihood with Gauss-Hermite quadrature.

Tobit estimates, however, are restrictive. Most importantly, the effects of regressors on the FDI decision (i.e., probit) and ownership are constrained to be proportional. This constraint is a demerit in specifying the firm's ownership behavior. So we present Heckman's (1979) two-step efficient estimators, which are free of the proportionality restriction. The equation to examine is the one for ownership, conditioned on the event of a FDI decision of equation (2). Following equations (5) and (??),

$$d\_FDI_{it} = \alpha X_{it} + u_{it}, \tag{6}$$

$$Own_{ijt} = \alpha G_{ijt} + \beta Y_{jt} + \rho\sigma\lambda(\alpha X_{it}) + \varepsilon_{ijt} \text{ if } FDI_{it} > 0, \tag{7}$$

where

a) u_i and ε_{ij} are independent of G_{ij} with zero mean,

b) $\varepsilon_{ij} \tilde{} N(0, \sigma)$, and $u_i \tilde{} N(0, 1)$,

c) $Cor(\varepsilon_{ij}, u_i) = \rho$.

And the nonselection hazard, what Heckman (1979) referred as the inverse of the Mill's

ratio, for each observation i is defined as $\lambda(\alpha X_{it}) = \phi(\alpha X_{it})/\Phi(\alpha X_{it})$ where $\phi()$ and $\Phi()$ are the standard normal and the standard cumulative normal density, respectively.

In Section 4, after the determinants of entry decision and ownership strategy are analyzed separately, Heckman's two-step estimation is conducted, which sheds light on simultaneous decision of entry decision and ownership strategies.

3 Data and Descriptive Statistics

3.1 Data

The sample of Japanese foreign subsidiaries is drawn from the 2001 *Kaigai Shinshutsu Kigyou* (Overseas Japanese Companies Data). Toyo Keizai compiles this data as a part of an annual survey of the overseas operations of major listed and non-listed Japanese companies. The survey data are supplemented by referring to annual reports, newspaper accounts and other media. Our initial sample totaled 13,779 subsidiaries.[2] Because parent company data were required for our analysis, we matched the identical parent company for each subsidiary to the companies obtained from the Nikkei Economic Electronic Databank System (NEEDS) *Nikkei Zaimu* of *Nihon Keizai Shinbun*. This dataset provides annual observations for about 4,000 Japanese companies listed on the country's six stock exchanges as well as companies registered in over-the-counter (OTC) markets and non-listed companies and includes 192 items of financial indexes reported by all companies excluding banks, securities and insurance companies extending from 1964 to 1999. The establishment year data are sourced from the Japan Company Handbook, documented annually by Toyo Keizai. Other variables, GDP per capita and exports, are from World Development Indicators (2002).

3.2 Trends of Ownership Strategy

Table 1 shows the average ownership and share of companies with full-ownership across years and industries. Over 1980-1999, the average ownership of Japanese companies in 13,779 foreign affiliates was 65.2 percent. By industry, non-manufacturing industries held

[2]The 4,441 subsidiaries which belong to the same parent compaines are excluded.

Table 1: Ownership Strategy by Years and Industries (Full Sample)

	Manufacturing	Non-manufacturing	Total
	Average Ownership		
1980-1984	62.3(536)	70.7(653)	66.9(1,189)
1985-1989	62.6(1,364)	71.5(1,854)	67.8(3,218)
1990-1994	62.2(1,635)	65.4(1,635)	64.1(4,113)
1995-1999	60.8(2,227)	66.4(3,032)	64.0(5,259)
Total	61.8(5,762)	67.6(8,017)	65.2(13,779)
	Share of Companies with Full Ownership		
1980-1984	51.1(536)	53.9(653)	52.6(1,189)
1985-1989	46.0(1,364)	54.4(1,854)	50.8(3,218)
1990-1994	43.1(1,635)	43.7(2,478)	43.4(4,113)
1995-1999	38.0(2,227)	44.5(3,032)	41.7(5,259)
Total	42.6(5,762)	47.3(8,017)	45.3(13,779)

Note: 1) The numbers of foreign affiliates are in parentheses.
2) Full ownership is defined as the level of ownership above 95 percent or more.

relatively higher ownership (67.6 percent) relative to that of manufacturing sector (61.8 percent). There is no significant change in this trend over years except a slight drop in the non-manufacturing sector.

Defining full-ownership as the 95 percent cutoff point, the share of companies with full ownership is higher for non-manufacturing sector (47.3 percent) than that of manufacturing sector (42.6 percent).[3] This share decreases both for manufacturing and non-manufacturing sectors in the 1990s, compared to that in the 1980s, which might reflect the economic depression in Japan during this period.

Table 2 presents recent trends of ownership strategy over years by quintile of real income per capita and geography of the host countries.[4] First, by quintile of real income per capita, there is no consistent trend in ownership strategy. For example, between 1980 and 1984, the second quintile held the highest ownership level (76.4 percent) while between 1995 and

[3]Gatignon and Anderson (1988), Gomes-Casseres (1990), Hennert (1991) and Padmanabhan and Cho (1996) used the same cutoff point.

[4]In the following estimation, real income per capita is used as an approximation of transaction advantage of host countries.

Table 2: Ownership Strategy by Income and Geography of the Host Countries

	80-84	85-89	90-94	95-99
Income per capita				
I	48.4	55.4	59.5	61.6
II	76.4	66.5	59.1	67.4
III	68.5	78.2	65.2	59.6
IV	74.8	68.8	74.9	70.4
V	68.8	69.6	63.1	60.9
Asia and Oceania	65.5	66.7	64.4	66.1
Middle East	52.8	59.7	65.7	61.6
Europe	63.6	72.1	64.5	58.3
North America	71.6	66.5	63.1	60.2
Latin America	65.8	69.6	59.0	53.4
Africa	77.5	70.6	82.1	66.2
Average	66.9	67.8	64.1	64.0
Number of companies	1,189	3,218	4,113	5,259

1999, the fourth quintile held the highest ownership. Second, in terms of geography of the host countries, FDI into countries in North America and Africa tends to hold higher level of ownership between 1980 and 1984 while FDI into Asia/Oceania and Africa holds higher ownership between 1995 and 1999. In general since 1980, the ownership of local companies by Japanese companies has tended to decrease in Europe, North and Latin America, and Africa while the investment in Asia/Oceania and Middle East has tended to show higher ownership level.

3.3 Determinants of Entry Decision and Ownership Strategy

The main determinants for entry decision and ownership strategy are classified into three groups. The first one is corporate governance which is reflected by the ownership structure of parent companies. It is assumed that corporate governance plays a significant role in deciding entry decision and ownership strategy. The second one is transaction advantage between the parent and host companies. The third group is the institutional environment of host countries which affects ownership strategy but not entry decision.

3.3.1 Corporate Governance

Corporate governance is defined by the ownership structure of the parent company. Ownership by shareholders is the right to possess something and to decide what is to be done with it. A shareholder who owns a majority of a company's voting shares has a controlling interest. His vote decides who, apart from himself or his representative, is appointed to the board of directors and so determines the policy of the business. This applies also when a few shareholders together own the majority. What remains in question then is how different ownership structures held by different economic agents affect FDI decision and ownership strategies. The share of foreign investors among main shareholders, i.e., government, financial institutions, individuals and foreigners, attract much research interests.

Table 3 shows the recent trends in ownership structures of manufacturing (Manu) and non-manufacturing (Non) industries since 1973, the first year of the availability of foreign ownership variable. The data includes six economic agents as shareholders: government/public institutions, financial institutions, security companies, foreigners, other corporations and individual investors. This paper categorizes them into five: government, foreigners, individuals, financial institutions (financial institutions and security companies) and other corporations.

The ownership structure of each category has shown different trends over the period. It is shown that the government ownership, although with many missing data, was higher in non-manufacturing sectors but the gap with other categories has narrowed since 1990s. Strikingly, foreign ownership has fluctuated since 1973 even though the absolute share is not high. For example, it has been stable until 1979 but has increased until 1985, decreased since then and increased again in 1989.[5] The ownership of financial institutions and other corporations tends to increase over time while that of individual investors indicates a decreasing trend between 1973 and 1991 and then stays stable until 1997. Since 1990, however, the gap among three agents, individuals, financial institutions and other corporations, becomes

[5]By sectors, as classified by Nikkei, the foreign ownership held by most of industries was less than 10 percent except for telecommunication (10.7 percent) in nonmanufacturing sector and pharmaceuticals (12.2 percent) and petroleum products (11.9 percent) in manufacturing sector. The data is available from the author on request.

Table 3: Recent Trends of Ownership Structure(percent)

	Government		Foreigner		Individual		Finance		Corporation	
	Manu	Non	Manu	Non	Manu	Non	Manu	Non	Manu	Non
1973	0.3	3.6	3.2	1.7	43.8	47.1	24.4	22.0	29.5	30.6
1975	0.2	2.0	2.7	1.2	43.0	46.3	24.4	22.0	30.9	31.1
1980	0.2	3.6	3.3	1.4	40.4	44.6	26.8	24.3	30.7	30.8
1985	0.2	3.1	5.8	3.6	34.4	40.2	28.5	24.6	31.3	32.4
1990	1.0	3.2	3.8	3.2	29.0	32.9	33.5	29.0	32.8	34.8
1995	0.2	0.6	5.5	4.9	30.0	33.0	32.2	28.1	31.4	33.8
1999	0.2	0.5	5.3	4.9	33.4	34.5	29.7	26.7	30.6	32.9
Total	0.2	1.6	4.5	3.7	34.9	37.7	29.3	26.2	31.3	32.9

Note: Manu and Non represent manufacturing and nonmanufacturing industries, respectively.

lower.

3.3.2 Transaction Advantage

Many empirical literature discussed above defines transactional advantage as intangible assets held by the parent companies. However, as in Figure 1, this does not reflect real transactional advantage between the parent companies and the local companies since the level of transactional advantage of the local competitors varies across host countries and/or companies. Thus to reflect true transactional advantage of the parent companies, it is necessary to control for the level of transactional advantage of the local competitors. In this paper, the transactional advantage of the parent company is approximated by intangible assets held by them and that of the local competitors is by the real GDP per capita of the host country.

1. Intangible assets

R&D intensity (knowledge) and advertising (goodwill) intensity are extensively used as representatives of intangible assets. Helpman (1984) and Markusen (1984) predict that firms with intangible assets would be more likely to invest abroad in order to minimize transaction costs and exploit their intangible assets overseas as well as at home.

As suggested by transaction cost theory, a greater degree of proprietary content in marketing and technological assets leads to higher ownership levels in the foreign operation

because MNEs prefer internal channels over contracts when transferring technological capabilities. A firm with high R&D intensity may prefer to have complete control over its proprietary know-how in order to preserve and/or best exploit the know-how, given imperfections in the external markets for technology (e.g., Buckley and Casson, 1976; Rugman, 1981; Caves, 1982). Thus, the higher the R&D intensity, the greater the possibility that the foreign affiliate will be fully-owned (Stopford and Wells, 1972; Davidson, 1982).

2. GDP per capita

When we consider ownership strategy across countries, the level of intangible assets is not enough to calculate transaction advantage between the parent company and the local competitors of the host country. So as an approximation of transactional advantage held by local competitors, per capita GDP is used. This variable can be interpreted as the level of labor productivity, representing the level of transactional advantage of the host countries.

3.3.3 Institutional Environment

In addition to transactional advantage variables, the institutional environment, i.e., the characteristics of host countries, has been shown to affect the ownership strategies.

In order to experiment with an appropriate choice of the institutional environment variable, Economic Freedom Indices, constructed by The Fraser Institute, are used. The data are released by 1 to 10 scale in every five years from 1970 to 1995 and every year afterward.[6] The core ingredients of economic freedom are personal choice, protection of private property and freedom of exchange. Individuals have economic freedom when: (a) their property acquired without the use of force, fraud, or theft is protected from physical invasions by others and (b) they are not forced to use, exchange, or give their property to another as long as their actions do not violate the identical rights of others.[7]

The use of government-whether directed by a monarch or a democratic process - to

[6]The missing data of other years are generated by linearly interpolate method.

[7]Instead, it is likely that what matters most to MNEs is the extent to which future policies, e.g., taxation and regulation, can be forecast and how sensitive these policies are the changes in the current political environment. Recent works by Delios and Henisz (2000) and Henisz and Zelner (2001) begin to rectify these problems by employing a more objective measure of policy change and comparing its effectiveness in predicting market entry modes.

decide what (and how) goods will be produced and who will consume them violates personal economic freedom. Other things constant, freer economies will rely more on markets and less on government to answer these basic economic questions. This is not to say that government has no role. Protection of property acquired without the use of force, fraud, or theft from physical invasion by others is also an integral element of economic freedom. This protection generally involves a legal structure and other institutional arrangements that enhance the operation of markets. Governments promote economic freedom when they provide these structures.

In an economically free society, the fundamental function of government is the protection of private property and the provision of a stable infrastructure for a voluntary exchange system. When a government fails to protect private property, takes property itself without full compensation, or establishes restrictions (and follow policies) that limit voluntary exchange, it violates the economic freedom of its citizens.

The summary index is based on 23 components designed to identify the consistency of institutional arrangements and policies with economic freedom in seven major areas. The seven areas covered by the index are: (I) size of government, (II) economic structure and use of markets, (III) monetary policy and price stability, (IV) freedom to use alternative currencies, (V) legal structure and security of private ownership, (VI) freedom to trade with foreigners, and (VII) freedom of exchange in capital markets. Principal component analysis was used to combine the components ratings into area ratings and the area ratings into a summary rating.[8]

[8]Areas I and II are indicators of reliance on markets rather than the political process (large government expenditures, state-operated enterprises, price controls, and discriminatory taxes) to allocate resources and determine the distribution of income. Areas III and IV reflect the availability of sound money. Area V focuses on the legal security of property rights and the enforcement of contracts. Area VI indicates the consistency of policies with free trade. Area VII is a measure of the degree to which markets are used to allocate capital. Reliance on markets, use of money, legal protection of property rights, free trade, and market allocation of capital are important elements of economic freedom captured by the index.

3.3.4 Other Variables

In addition to the variables mentioned above, other control variables are included in estimations. They are investing firm's size, age and membership to Keiretsu, and the ratio of export to GDP.

1. The size of the parent company

Greater size allows companies to engage in more extensive international activities because it is reasoned that they are more likely to possess the necessary financial resources for foreign operations. The size of the parent company is measured by the ratio of the total assets to total sales at the time (year) of foreign entry.

2. Age

Setting up a first plant in a foreign country is a major strategic decision for most firms because it represents a departure from the organization's traditional practices and is surrounded by unusual uncertainty, thus requiring firms to search for information and legitimacy. Age is a potentially important variable affecting new market entry. Organizational ecologists have long argued that a firm's likelihood of engaging in strategic change depends on its age. The key concept in their reasoning is structural inertia. The older the firm, the less likely it is to engage in change or adaptation because the proliferation of rules, routines, and internal organizational arrangements over time reinforces the organization's adopted course of action (Hannan and Freeman, 1984; Haveman, 1993; Ranger-Moore, 1997).[9]

3. Exports

Conventional neoclassical models of the MNEs view exports and FDI as substitutes,

[9]Most empirical research adopting an organizational ecology perspective have established that organizational age reduces the firm's ability to learn, its chances of changing strategy or behavior, its growth rates, and/or its odds of survival (Barnett, 1990; Baum and Mezias, 1992; Amburgey, Dacin, and Kelly, 1993; Barron, West and Hannan, 1994; Ranger-Moore, 1997; Sorensen and Stuart, 2000). There are, however, some studies that found age to increase firm survival (Evans, 1987; Carroll, Bigelow, Seidel and Tsai, 1996), and others that encountered variation in the shape of age dependence according to the firm's strategy (Henderson, 1999). However, these empirical disagreements do not undermine the logic of the inertia argument that, controlling for industry characteristics and firm size, older firms find it more difficult than younger ones to shift well-established operations abroad because such a change would upset long-standing internal organizational arrangements and patterns of relationships with suppliers and workers.

particularly in the manufacturing sector. In addition, if FDI is directed to industries in which Japan has comparative advantages, then imports and FDI are likely to be positively related.[10] In particular, new products require specific skills and knowledge so that effective maintenance and support can be provided. The parent company may also find quality supervision more effective if it directly controls the network. Hence, whether exports and FDI are substitutes or complements needs to be resolved empirically.

4. Keiretsu

In addition to firm-specific assets, there are indications that there is a role to play for interfirm linkages within Japanese business group, keiretsu. For instance, Hoshi, Kashyap, and Scharfstein (1992) found that firms that are members of one of the six bank-centered (horizontal) keiretsu are significantly less liquidity constrained in their investment decisions than non-member firms. This could imply that membership of horizontal business groups also helps to facilitate financing of risky foreign ventures.

The variables listed above and used in the estimation are summarized in Table 4 and the matrix of correlation coefficients of the variables is reported in the Appendix.

4 Estimation Results

This section tests the determinants of entry decision and ownership strategies by MNEs. After the baseline model specification, i.e., traditional model specification on the determinants of entry decision and ownership strategy, is tested, then the determinants of two decisions are separately estimated by using probit and tobit estimation techniques. Then using a sample selection model by Heckman (1979), they are jointly tested.

4.1 Baseline Model Specification

This subsection tests the role of transaction advantage and other control variables which have been used in the traditional approach on the determinants of FDI and ownership strat-

[10] Graham and Krugmen (1993) argue that, for some industries, foreign investment is likely to be complementary with trade. Baldwin (1990) suggests that downstream services are typically associated with the level of export sales from the parent country to the host country. Some of these facilities can be set up by locals, although parent country involvement may be beneficial.

Table 4: Main Variables

Variable	Variable	Definition
Corporate governance	Foreign	ownership of foreign investors
	Individual	ownership of individual investors
	Finance	ownership of financial institutions
Transaction advantage	R&D	R&D expenditures/sales
	Advertisement	advertising expenditures/sales
	GDP	real gdp per capita
Institutional environment	Institution	Economic freedom index
Other variables	Export	export/sales
	Firm size	assets/sales
	Age	age of parent company
	Keiretsu	large bank-centered groups

egy. As discussed in the introduction, the study on FDI decision uses only companies which have decided to invest abroad but we include all domestic and multinational companies. Table 5 reports the estimation results for entry decision (Decision) by probit analysis and ownership strategy (Ownership) by tobit analysis, respectively.

In contrast to the expectation, age is positively related to entry decision so that the older the firm, the more likely it is to engage in change, i.e., investment abroad. But age is negatively related to ownership strategy, showing that elder firms prefer lower ownership level. The results for variables which reflect transactional advantage are interesting. Advertising and R&D intensity are positively related to FDI entry decision but negatively related to ownership strategy. In addition, firm size plays a positive role for entry decision but a negative role for choosing ownership levels. Another control variable, keiretsu, is not related to entry decision but is negatively related to ownership strategy which implies that the company in Keiretsu prefers lower ownership levels. The following subsection tests the robustness of these estimation results.

Table 5: Baseline Model: Entry Decision and Ownership Strategy

	Decision		Ownership	
	(1)	(2)	(3)	(4)
Age	0.012	0.011	-0.145	-0.152
	(5.21)**	(5.00)**	(-2.16)*	(-1.71)
Advertisement	1.963	2.113	-221.885	-275.328
	(2.07)*	(1.31)	(-2.77)**	(-2.83)**
Firm size	-0.114	-0.244	7.392	6.602
	(-2.82)**	(-2.39)*	(2.79)**	(1.30)
Keiretsu	0.061	-0.002	-10.095	-11.558
	(0.71)	(-0.03)	(-3.27)**	(-2.75)**
R&D		15.243		-160.846
		(9.03)**		(-2.45)*
Constant	-2.278	-2.041	108.149	108.581
	(14.28)**	(10.55)**	(9.54)**	(6.95)**
year dummies	included	included	included	included
industry dummies	included	included	included	included
Observations	37,645	21,401	7,882	5,421

Note: 1) Robust z statistics in parentheses.
2) * significant at 5%; ** significant at 1%.

4.2 Entry Decision

The probit estimation results for entry decision of all companies are reported in Table 6. Two main variables which reflect intangible assets, advertising intensity and R&D intensity, show different estimation results. First, the advertising intensity is not consistently significant. This variable plays a positive role for Specifications (4) and (5) in Table 5 after industry dummies are included while it is not significant for Specifications (1), (2) and (3) without industry dummies. However, another variable, R&D intensity, is shown to be positive and significant for all model specifications. These results might be from their definitions. Advertising expenditure might reflect mostly the expenditure for domestic markets so that high share of advertising relative to total sales does not necessarily reflect more advertisement expenditure in foreign countries. In this case, these companies with more advertisement expenditure in home country might tend to invest domestically rather than abroad. So to reflect transaction advantage over local companies abroad, it might be necessary to look for the advertising expenditure in foreign countries. However, R&D expenditure

might reflect transaction advantage over domestic as well as foreign companies at the same time so that this advantage shows consistently positive coefficient.

In addition, Table 6 includes the ownership structure of parent companies which reflect corporate governance. The shareholders, foreign investors and financial institutions, tend to increase the incentive to invest abroad while individual investors are reluctant to invest abroad. As one of other control variables, the size of parent companies tends to show negative coefficient, implying that the size of parent company is inversely related with the incentive to invest abroad. The ratio of exports to sales shows positive coefficient and thus the conventional view on the relation between FDI and exports is not supported empirically. Other control variables, age and keiretsu, are not shown to be significant which implies that the ecological perspective on foreign investment is not supported.

4.3 Ownership Strategy

The ownership strategy by MNEs is tested through tobit estimation. Estimation results are reported in Table 7. As in the estimation results for entry decision in Table 6, after other control variables are added to the baseline model specification, age plays no significant role for ownership strategy. Further, one of the transaction advantage variables, R&D intensity, does not show a significant role, which is consistent with the findings of Delios and Beamish (1999) for East Asian countries. On the other hand, another variable, advertising intensity, is shown to be negative and significant for Specifications (3) and (4) and is significant only at the 10 percent level for Specifications (1) and (2). In principle, it can be interpreted that the advertising intensity data used in the estimation reflect expenditure mainly for domestic market rather than foreign markets. The income per capita of host countries is shown to be negative and significant. Higher income per capita of the host country means that technology gap with the home country is narrowed so that given institutional environment, MNEs prefer lower level of ownership. Thus these findings support ownership strategy by transaction advantage.

The shareholders of the parent companies play an important role as well. Especially, foreign investors and financial institutions are relatively reluctant to hold more shares of local companies while individual investors do not show a significant tendency. As Table

Table 6: Entry Decision

	(1)	(2)	(3)	(4)	(5)	(6)
Foreign	2.943	2.861	2.369	2.774	2.569	2.030
	(7.47)**	(5.87)**	(5.11)**	(8.16)**	(6.16)**	(4.82)**
Individual	-1.409	-0.994	-0.755	-1.210	-0.858	-0.981
	(-5.38)**	(-3.98)**	(-3.17)**	(-5.34)**	(-3.62)**	(-4.01)**
Finance	3.220	2.733	2.686	3.208	2.812	2.316
	(10.61)**	(7.67)**	(7.28)**	(14.03)**	(11.47)**	(10.44)**
Age	-0.002	-0.004	-0.003	-0.0003	0.0001	0.002
	(-0.91)	(-1.32)	(-0.88)	(-0.12)	(0.06)	(0.92)
Advertisement	-1.143	-0.539	-0.065	3.529	3.190	4.095
	(-0.92)	(-0.45)	(-0.05)	(3.04)**	(2.09)*	(1.87)
Firm size	-0.258	-0.378	-0.612	-0.173	-0.271	-0.255
	(-3.80)**	(-3.01)**	(-4.31)**	(-4.57)**	(-3.12)**	(-3.21)**
Keiretsu	-0.014	0.027	0.027	0.078	0.046	0.028
	(-0.16)	(0.31)	(0.31)	(1.10)	(0.60)	(0.31)
R&D		4.959	3.023		10.142	8.403
		(3.36)**	(2.04)*		(6.58)**	(5.00)**
Exports			1.515			1.264
			(8.83)**			(6.50)**
Constant	-1.620	-1.590	-1.683	-2.388	-2.279	-1.940
	(-9.29)**	(-7.88)**	(-8.51)**	(-13.02)**	(-10.67)**	(-7.10)**
year dummies	included	included	included	included	included	included
industry dummies				included	included	included
observations	33,500	19,945	15,743	33,500	19,928	15,743

Note: 1) Robust z statistics are in parentheses. 2) * significant at 5%; ** significant at 1%.

7 shows, foreign investors and financial institutions prefer to invest abroad. The size of the parent companies shows a positive coefficient, which implies that the larger the parent companies, the higher the ownership they want to hold. The estimation results for the firm size in Tables 6 and 7 imply that even though larger companies are reluctant to invest abroad, larger companies among MNEs tend to hold higher ownership of local companies.

Another important control variable, institution, shows a positive and significant coefficient, implying that the host countries favorable to MNEs tend to make them hold higher share of local companies which is quite consistent with theoretical background discussed in the first section. Interestingly, Keiretsu is negatively related with ownership level in Specifications (3) and (4), and age tends to show positive but is not shown to be significant except for Specification (2).

In general, the hypothesis discussed in Section 2 that ownership strategy is affected by the combination of transaction advantage and institutional environment is well supported. Furthermore, corporate governance is shown to play a significant role.

4.4 A Heckman's Sample Selection Model

As discussed in the introduction, the empirical analysis to investigate determinants of overseas entry decision as well as ownership strategy does not consider the behaviors of other domestic companies which do not join investment abroad and thus the estimation might be subject to a sample selection bias. Thus this paper follows two steps: estimation for the determinants of FDI entry decision by considering all companies (domestic and MNEs) and then estimation of the determinants of ownership strategy of all MNEs.

Table 8 reports the estimation results by following a Heckman's sample selection model. In order to consider the effect of a change in sample size, the probit estimation results for entry decision are reported as well. Since they are quite consistent with those of Table 6, this subsection discusses the estimation results only for ownership strategy. Tables 9 and 10 report the estimation results of a sample selection model by manufacturing (all and large companies) and nonmanufacturing sectors, respectively.[11] Throughout this section,

[11] Large companies in manufacturing sector are defined as those with more than 300 employees (Small and Medium Enterprise Agency, Japan).

Table 7: Ownership Strategy

	(1)	(2)	(3)	(4)
Foreign	-85.990	-99.930	-64.980	-93.016
	(-5.30)**	(-4.48)**	(-3.86)**	(-4.08)**
Individual	4.456	5.973	11.741	11.706
	(0.40)	(0.40)	(0.99)	(0.76)
Finance	-52.459	-54.897	-53.789	-62.121
	(-6.05)**	(-4.87)**	(-5.90)**	(-5.05)**
Age	0.135	0.190	0.100	0.136
	(1.93)	(2.11)*	(1.33)	(1.36)
Advertisement	-138.329	-171.695	-186.239	-249.243
	(-1.79)	(-1.82)	(-2.18)*	(-2.44)*
Firm size	9.893	14.800	9.812	8.486
	(4.07)**	(3.35)**	(3.10)**	(1.59)
Institution	13.400	14.378	13.546	14.314
	(12.46)**	(10.02)**	(12.06)**	(9.71)**
GDP/100	-0.061	-0.071	-0.060	-0.061
	(-3.98)**	(-3.55)**	(-3.84)**	(-3.03)**
Keiretsu	-1.862	-5.593	-7.682	-11.077
	(-0.58)	(-1.29)	(-2.33)*	(-2.49)*
R&D		-49.177		-52.960
		(-0.85)		(-0.75)
year dummies	included	included	included	Included
industry dummies			included	included
observations	7,223	5,003	7,223	5,003

Note: 1) Robust z statistics are in parentheses.

2) * significant at 5%; ** significant at 1%.

Specifications (4) and (5) in Table 6 are used as selection equations, respectively. Since industry dummies are included in the selection equations, they are excluded in ownership equations due to identification problem.

First, the selection bias is critical since the hypothesis that the cefficient for the inverse of the Mill's ratio, λ, is equal to zero is rejected for all estimation specifications. However, since the same hypothesis is not rejected for the estimation of nonmanufacturing sector, the interpretation of estimation results is focused mainly on manufacturing sector (Tables 8 and 9).

Second, like the results in Tables 6 and 7, age is not shown to be significant so that an organizational ecology perspective has not been supported even under consideration of a sample selection bias.

Third, the variables which reflect transaction advantage are interesting. The estimation results for advertisement intensity are clear. This variable is shown to be positive and significant for entry decision but is not shown to be significant for ownership strategy which is contrast to the results of tobit estimation in Table 7 even though they are significant only at the 10 percent level.[12] Thus if we consider a sample selection bias, the role of advertisement intensity for ownership strategy disappears. As Table 7 shows, R&D intensity does not play a significant role in deciding ownership strategy. After controlling for a sample selection bias, we get the same result. However, if we estimate the same model by manufacturing and nonmanufacturing industries, the coefficients for R&D are shown to be opposite. R&D expenditure intensity plays a positive role in manufacturing sector while a negative role in nonmanufacturing sector, which leads to no significant role if both sectors are estimated jointly. Another variable which reflects transaction advantage, real income per capita, is shown to be negative and significant over all estimation specifications. Thus if we assume that it reflects the level of productivity of the host country, it can be interpreted that transaction advantage is inversely related with ownership strategy after other variables are controlled for. From these findings, we cannot reject the role of transaction cost approach.

[12]This result can be clearly interpreted by the results of Tables 9 and 10. The advertisement variable is shown to be positive for manufacturing but negative for non-manufacturing sector even though two coefficients are not significant at the 5 percent level.

Fourth, the results on the ownership structure of the parent company are shown to be different from the results by separate estimation. Table 7 shows that individual investors do not play a significant role in deciding ownership strategy. If we consider a sample selection bias, however, they are shown to be more risk averse so that they tend to prefer lower ownership. Financial institutions show different results. The results by separate estimation show that financial institutions prefer to hold lower ownership for local companies. On the other hand, Table 8 shows that by considering a sample selection bias, they do not show significant role in deciding ownership strategy. The estimation results by industries of Table 9 are consistent but less robust results for foreign investors: they do not prefer to hold higher ownership.

Fifth, as in all other estimation results, institution variable is positive and significant for ownership strategy even though the value of the coefficient decreases under consideration of a sample selection bias. Furthermore, it is shown that the institution variable is quite robust over all estimation techniques and model specifications.

Finally, the role of the size of the parent company is quite interesting. As Tables 6 and 7 show, larger companies are reluctant to invest abroad but MNEs themselves prefer to hold larger shares of local companies as size increases. However, the effect of the firm size on ownership strategy disappears under consideration of a sample selection bias of Table 8. The reason becomes clearer by the estimation results of Tables 9 and 10. The firm size is not shown to be significant for all manufacturing and large companies with more than 300 employees. In contrast, it plays a positive and significant role for non-manufacturing industries (Table 10). Thus under consideration of a possible sample selection bias, the firm size on ownership strategy plays an important role only for nonmanufacturing industry.

5 Conclusion

Using 20-year panel data, this paper tests Japanese companies' sequential decisions: (1) to invest abroad or not and (2) if they decide to invest abroad, what ownership strategy for that local company to be employed.

Through Heckman's two-step estimation procedure, corporate governance plays an im-

portant role for entry decision but not for ownership strategy decision. For example, foreign investors and financial institutions tend to invest abroad while individual investors do not. However, they do not affect the ownership strategy in the host countries.

Second, transactional cost approach on entry decision and ownership strategy is well supported. Advertisement and R&D intensities show positive relation with the decision to invest abroad although they are found to be not significant for ownership strategy. However, separate estimation results for manufacturing and nonmanufacturing sectors show an important role of R&D intensity by showing positive and significant for manufacturing sector but negative and significant for nonmanufacturing sector. In addition, real GDP per capita as an approximation of productivity level of host country is shown to be negative and significant for ownership strategy.

Third, most importantly, the institutional environment favorable to MNEs leads to higher level of ownership of local companies. Finally, other control variables such as age and keiretsu are not shown to be significant for entry decision as well as ownership strategy. Thus an organizational ecology perspective is not supported.

In conclusion, under consideration of a sample selection bias, institutional environment is shown to be more important than transaction variables for ownership strategy. In addition, as a part of transaction variables, per capita GDP of the host countries is an important determinant of ownership strategy. Thus the hypothesis that entry choice and ownership strategy are determined by a combination of transaction cost approach and institutional environment is well supported. And once the corporate governance of the parent company which is shown to be significant for entry decision is controlled for, we find that firm age becomes less important in explaining entry decision as well as ownership strategy.

Table 8: A Sample Selection Model

	(1)		(2)		(3)	
	decision	ownership	decision	ownership	decision	ownership
Foreign	2.878	-15.322	2.663	-16.569	2.045	-15.49
	(22.30)**	(-1.92)	(16.37)**	(-1.64)	(11.64)**	(-1.52)
Individual	-1.044	-13.831	-0.814	-11.116	-0.827	-9.662
	(-12.36)**	(-2.61)**	(-7.64)**	(-1.74)	(-7.07)**	(-1.45)
Finance	3.086	4.383	2.665	2.386	2.363	3.968
	(44.50)**	(0.76)	(30.94)**	(0.37)	(24.82)**	(0.61)
Age	-0.001	0.020	-0.0001	0.035	0.003	0.054
	(-1.39)	(0.67)	(-0.19)	(0.96)	(3.15)**	(1.38)
Advertisement	3.944	-68.017	3.786	-76.760	3.067	-90.585
	(7.57)**	(-2.14)*	(6.32)**	(-2.07)*	(4.12)**	(-2.09)*
Firm size	-0.141	1.043	-0.173	1.015	-0.229	-0.415
	(-7.43)**	(1.10)	(-4.59)**	(0.55)	(-5.44)**	(-0.21)
Institution		4.378		4.566		4.785
		(8.14)**		(6.85)**		(6.91)**
GDP/100		-0.025		-0.029		-0.036
		(-3.67)**		(-3.48)**		(-4.16)**
Keiretsu	0.056	-1.689	0.024	-2.042	0.014	-0.634
	(2.20)*	(-1.27)	(0.73)	(-1.18)	(0.38)	(-0.34)
R&D			10.292	37.88	8.742	33.375
			(15.67)**	(1.55)	(12.74)**	(1.36)
Exports					1.390	
					(16.72)**	
Constant	-2.466	24.347	-2.412	18.670	-1.944	14.965
	(-28.92)**	(3.59)**	(-21.84)**	(2.17)*	(-15.16)**	(1.74)
year dummies	included	included	included	included	included	included
industry dummies	included		included		included	
Mills lamda	12.163		14.107		15.603	
	(6.09)**		(5.68)**		(6.39)**	
rho	0.300		0.341		0.375	
sigma	40.481		41.340		41.625	
observations	31,113		18,785		14,654	

Note: 1) Robust z statistics are in parentheses. 2) * significant at 5%; ** significant at 1%.
3) Mills lamda is rho multiplied by sigma.

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Table 9: Ownership Strategy by A Sample Selection Model: *Manufacturing Sector*

	All		Large	
	(1)	(2)	(3)	(4)
Foreign	13.516	-1.153	7.240	-9.478
	(1.36)	(-0.10)	(0.71)	(-0.83)
Individual	-18.220	-11.521	-19.520	-13.587
	(-2.79)**	(-1.61)	(-2.93)**	(-1.84)
Finance	16.655	6.656	14.917	5.967
	(2.26)*	(0.88)	(2.05)*	(0.80)
Age	0.016	0.052	0.032	0.063
	(0.41)	(1.23)	(0.80)	(1.49)
Advertisement	-61.053	-71.321	-53.287	-63.983
	(-1.56)	(-1.65)	(-1.35)	(-1.47)
Firm size	1.492	0.494	2.071	1.037
	(0.81)	(0.22)	(1.10)	(0.45)
Institution	5.161	5.771	5.086	5.733
	(7.87)**	(7.82)**	(7.70)**	(7.72)**
GDP/100	-0.036	-0.043	-0.037	-0.045
	(-4.36)**	(-4.67)**	(-4.48)**	(-4.82)**
Keiretsu	-4.369	-2.882	-4.600	-3.031
	(-2.83)**	(-1.52)	(-2.94)**	(-1.59)
R&D		89.849		91.564
		(3.20)**		(3.24)**
Constant	1.227	-1.619	2.114	-0.921
	(0.15)	(-0.17)	(0.25)	(-0.10)
year dummies	included	included	included	included
mills lamda	23.080	22.174	23.557	22.689
	(8.43)**	(7.19)**	(8.22)**	(7.15)**
rho	0.526	0.510	0.535	0.520
sigma	43.891	43.485	44.073	43.654
observations	20,170	14,803	18,239	13,842

Note: 1) Robust z statistics are in parentheses.

2) * significant at 5%; ** significant at 1%.

3) Mills lamda is rho multiplied by sigma.

Table 10: A Sample Selection Model: Non-Manufacturing Sector

	(1)		(2)	
	decision	ownership	decision	ownership
Foreign	3.590	-53.985	5.314	-97.575
	(12.95)**	(-3.28)**	(10.94)**	(-3.03)**
Individual	-1.265	-6.192	0.009	-15.945
	(-8.46)**	(-0.62)	(0.03)	(-1.02)
Finance	3.067	-7.953	3.134	-15.831
	(24.78)**	(-0.74)	(15.43)**	(-1.02)
Age	0.001	0.026	-0.001	-0.012
	(0.89)	(0.52)	(-0.14)	(-0.12)
Advertisement	0.578	12.254	0.593	-28.368
	(0.51)	(0.20)	(0.39)	(-0.37)
Firm size	-0.123	2.218	24.066	7.971
	(5.66)**	(1.92)	(7.34)**	(2.19)*
Institution		2.713		-0.896
		(2.92)**		(-0.59)
GDP/100		-0.001		0.041
		(-0.08)		(2.14)*
Keiretsu	0.098	4.874	-0.231	3.625
	(1.85)	(1.54)	(-2.71)**	(0.75)
R&D			24.066	-434.673
			(7.34)**	(-3.42)**
Constant	-2.468	45.994	-3.910	69.035
	(-15.15)**	(3.66)**	(-9.94)**	(2.36)*
year dummies	included	included	included	included
industry dummies	included		included	
mills lamda	1.745		0.113	
	(0.520)		(0.03)	
rho	0.047		0.003	
sigma	37.403		38.184	
observations	10,943		3,982	

Note: 1) Robust z statistics are in parentheses.

2) * significant at 5%; ** significant at 1%.

3) Mills lamda is rho multiplied by sigma.

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Table A1: Correlation Coefficients

	Foreign	Individual	Finance	Age	Advertisement	Firm size
Foreign	1.0000					
Individual	-0.2961	1.0000				
Finance	0.0747	-0.3410	1.0000			
Age	0.0303	-0.1210	0.2663	1.0000		
Advertisement	0.0257	0.1165	-0.0307	-0.0252	1.0000	
Firm size	0.0204	0.1992	-0.1303	-0.0206	0.0787	1.0000
Institution	-0.0183	0.0128	-0.0146	-0.0176	0.0137	0.0960
GDP	-0.0162	0.0279	0.0053	-0.0468	0.0800	0.0998
Keiretsu	-0.1151	0.0620	0.1178	0.1151	-0.3174	-0.1321
R&D	0.2249	-0.0324	0.1043	0.1785	0.2347	0.2618
Exports	0.1698	-0.0316	-0.0165	-0.1312	0.0886	0.1065

	Institution	GDP	Keiretsu	R&D	Exports
Foreign					
Individual					
Finance					
Age					
Advertisement					
Firm size					
Institution	1.0000				
GDP	0.7810	1.0000			
Keiretsu	-0.0185	-0.0353	1.0000		
R&D	0.0657	0.0982	-0.0679	1.0000	
Exports	-0.0058	0.0542	-0.0207	0.1630	1.0000

Table A2: Descriptive Statistics

	80-84	85-89	90-94	95-99
Foreign	0.043	0.043	0.043	0.065
	(7,269)	(9,693)	(11,734)	(13,621)
Individual	0.389	0.326	0.290	0.294
	(9,680)	(11,380)	(12,966)	(14,054)
Finance	0.282	0.333	0.356	0.336
	(8,785)	(10,392)	(12,081)	(13,742)
Age	40.897	44.585	48.348	53.279
	(8,727)	(10,956)	(11,686)	(12,712)
Advertisement	0.009	0.010	0.010	0.009
	(9,382)	(10,903)	(12,332)	(12,967)
Firm size	0.628	0.751	0.802	0.836
	(10,499)	(12,123)	(13,453)	(14,189)
Institution	6.908	7.373	7.187	7.272
	(1,759)	(4,432)	(5,763)	(7,273)
GDP/100 (US$)	111.616	131.291	105.283	93.484
	(1,886)	(4,437)	(5,872)	(7,291)
Keiretsu	0.843	0.845	0.839	0.839
	(8,861)	(10,845)	(11,299)	(12,173)
R&D	0.010	0.015	0.017	0.017
	(4,759)	(5,951)	(7,002)	(7,643)
Exports	0.160	0.155	0.145	0.163
	(5,782)	(6,796)	(7,519)	(8,449)

Note: the number of companies are in the parenthesis.